

Appendix

```

*****
;
;
;   File Name: MAIN.S
;
;   7/25/00   - SN V0.1
;
;   This is the main module. When not processing anything the execution remains
;   in this module at all times.
;
*****
;
;   must be in this order
;
;
;   .include      "fvt.inc"
;   .include      "keydef.inc"
;   .include      "data.inc"
;   .include      "equ.inc"
;   .include      "macro.inc"
;
;   .global KEY_NUMBER, KEY_NUMBER_BUFFER
;
;   .extern irq0
;   .extern irq1
;   .extern irq2
;   .extern irq3
;   .extern irq4
;   .extern irq5
;
;   .extern      check_key
;   .extern      ScanKeyPad
;   .extern      WaitForKeyPress
;   .extern      ServiceCode
;   .extern      wait_key_off
;   .extern      set_t16_timer
;   .extern      disable_t16_timer
;   .extern      DialOut
;   .extern      delay_100ms
;   .extern      SWInitialize
;
*****
;
;   interrupt vectors
;
*****

```

main

```
;
irq0_vec:
    .word  irq0
irq1_vec:
    .word  irq1
irq2_vec:
    .word  irq2
irq3_vec:
    .word  irq3
irq4_vec:
    .word  irq4
irq5_vec:
    .word  irq5
;
;*****
;
RESET - main entry
;*****
;*****
;*****
Initialize stack pointer hi and low bytes.
;*****
    ld      SPH, #HIGH(stack_ptr)
    ld      SPL, #LOW (stack_ptr)
;*****
;*****
Initialize port modes.
p01m and p2m defaults are used. They are fine.
;*****
;*****
    ld      P3M, #00h          ; p32, p33, p31, p30 = inputs
    ld      P2M, #0ffh         ; p2 = inputs (for keyscan rows)
    ld      P01M, #00000100b    ; p0 = outputs (for leds) and keyscan
columns
;*****
;*****
; Reset the counters.
;*****
;*****
srp  EXTEND_GROUP_D
ld   ctr0, #T8_RESET_TOUT
ld   ctr1, #03h      ;(#TC8_16_OUT)| (#INIT_T8_OUT_HIGH)|
```

main

```
(#INIT_T16_OUT_HIGH)      ; port 3.6 is timer output
ld      ctr2, #T16_RESET_TOUT

srp     EXTEND_GROUP_F
ld      wdtmr, #00
ld      0, #0FEh          ;PCON register is 0

; ***** Strictly for OTP 'E72/E73' *****
ld      0eh, #00000100b

;
;
; BRRRR... Start me up..

; ** check if warm or cold start **
tbitnz smr, #BIT7, warm    ;Check for warm start.

;
; ** COLD START **
ld      smr, #00100000b

; ** Clear Internal RAM if COLD START and RAM CURROPTED **
srp     REG_GROUP
cp      CHECK1, #0AAh      ;Check if RAM should be
cleared after cold start
jr      ne, ClearRam
cp      CHECK2, #0AAh
jr      ne, ClearRam
cp      CHECK3, #0AAh
jr      eq, warm

ClearRam:
srp     0
ld      r5, SPL

ClearLoop:
clr     @r5
dec     r5
cp      r5, #05h
jr      nz, ClearLoop

ld      CHECK1, #0AAh      ;load fields with values to be
checked on cold boot
ld      CHECK2, #0AAh
```

main

ld CHECK3, #0AAh

```
*****
; Warm start
; check key depressed
; if key is not depressed then return with
; KEY_NUMBER = 0xff;
*****
```

warm:

```
srp REG_GROUP
ld MODE,#0
ld P_MODE,#0
ld p2,#0fh ;initialize p2
ld p1,#47h ;Initialize p1
or p3,#BIT6 ;CS=high
ld p0,#BIT3 ;RS0=0
```

RedLedOff ;Make sure the record led is off

```
ld r1,p3
or p3,#BIT1
or p3,#BIT2
tbitz p3,#BIT1,DialOutBaby ;Check Battery Voltage
tbitz p3,#BIT2,DialOutBaby ;Check Battery Voltage
```

```
call WaitForKeyPress ;Wait for key press
jr nc, warm ; None, do other stuff..
```

GotANewValidKey:

```
call ServiceCode ;serice the key accordingly.
call WaitForKeyPress ;wait for another key.
jr c, GotANewValidKey
call disable_t16_timer ;disable timers.
```

CheckforBatteryVoltage:

```
tbitz p3,#BIT1,DialOutBaby
tbitz p3,#BIT2,DialOutBaby
```

```
jr warm ; If both batteries OK.
;continue on.
```

DialOutBaby:

main

;Check battery voltage if voltage is less
;than

normal. Dial out.

```
; ld 41h, #02h
; ld 42h, #08h
; ld 43h, #02h
; ld 44h, #09h
; ld 45h, #0ffh
; ld 46h, #09h
; ld 47h, #03h
; ld 48h, #06h
; ld 49h, #05h
; ld 4ah, #03h
; ld 4bh, #05h
ld 4ch, #0ffh
```

call delay_100ms

call DialOut

jr warm ; go back to

work....

.byte "Copyright (c)2000-2001 Chamberlain Group. Developed by Yamtech Inc, 847
963 2829"

```

;*****X

```

```

; SERVICE KEY

```

```

;     File Name: SRVKEY.S

```

```

;     8/14/00 - V1.0 SN

```

```

;     This routine services the keys on the charger unit.

```

```

;     The main functions provided are

```

```

;     1. learning the phone number.

```

```

;     2. Enable recording of ogm.

```

```

;     3. Enable playback of ogm.

```

```

;*****

```

```

; .include "fvt.inc"

```

```

; .include "keydef.inc"

```

```

; .include "data.inc"

```

```

; .include "equ.inc"

```

```

; .include "macro.inc"

```

```

; .global ServiceCode

```

```

; .global DeviceLightsOff

```

```

; .global DevLightKey

```

```

; .extern FlashGreenLed

```

```

; .extern WaitForKeyReleaseFlashRed

```

```

; .extern wait_key_off, port_delay

```

```

; .extern WaitForKeyRelease, WaitForKeyPressUserDelay, WaitForKeyPress

```

```

; .extern WaitForKeyReleaseAndStartThreeSecTimer

```

```

; .extern Delay70ms, set_t16_timer, disable_t16_timer

```

```

;*****

```

```

;     Service key code

```

```

;     Key Number in 'KEY_NUMBER'

```

```

;*****

```

```

ServiceCode:

```

```

    cp    KEY_NUMBER, #MAX_VALID_KEY

```

```

    jr    ugt, ServiceExit          ;check if key pressed is valid

```

```

    cp    KEY_NUMBER, #KEY_RECORD

```

```

    jp    eq, ProcessRecordKey      ;Record OGM

```

```

    cp    KEY_NUMBER, #KEY_PROGRAM

```

```

jp      eq,LearnAPhoneNumber ;ProcessProgramKey
;Program phone number

```

```

; call WaitForKeyReleaseAndStartThreeSecTimer ;if device key pressed for

```

```

; jp nc, ProcessDeviceKey ;three seconds learn a code
; ld KEY_FOR_CODE_FLAG, KEY_NUMBER
; jp LearnAPhoneNumber

```

ServiceExit:

```
ret
```

```
*****
```

```
; LearnAPhoneNumber
```

Function:

Learns the Phone number. Max of 10 digits. The first digit cannot be a 0.

Inputs:

DEVICE_FLAG

Returns:

CF = 0 - OK Set PhoneNumberOK Flag

CF = 1 - Error Reset PhoneNumberOK Flag

Modifies:

DigitPointer .equ 40h ;Store Digits

LoopCounter .equ r8

Multiplier .equ r11

CodeEntered .equ r13

Subords:

WaitForKeyPress

CheckFirstDigit

mul_8

```
*****
```

LearnAPhoneNumber:

```

or      MODE, #PROGRAM_MODE
and     p1, #10111111b

```

```

    ld      DigitPointer,#41h
continue:
    call    wait_key_off      ;Wait for release of key
    ldrr    LOOP_COUNTER_H,LOOP_COUNTER_L,T30_SECONDS
    call    WaitForKeyPressUserDelay    ;waits 30 seconds in learn mode
    jp      nc,LearnPhoneError

CheckForDigit:
    call    CheckFirstDigit    ; check if first digit is valid
    jp      c, LearnPhoneError    ;
    ld      @DigitPointer, KEY_NUMBER    ;first digit OK store it
    inc     DigitPointer

StoreDigits:
    call    WaitForKeyPress    ;loop to get more digits or
time out
    jp      nc, LearnPhoneError
    GreenLedOn
    cp      KEY_NUMBER, #9        ;if number key not
pressed exit error
    jp      ugt, LearnPhoneError    ;key pressed is not a digit, exit
error

    ld      @DigitPointer, KEY_NUMBER    ;load the digit into storage
    inc     DigitPointer            ;increment pointer to digits

    djnz    LoopCounter, StoreDigits    ;decrement digit counter

LearnPhoneOK:
    ld      @DigitPointer,#0ffh        ;Indicates termination of
phone number
    RedLedOff                ;exit point when things are good
    ld      MODE, #0
    rcf
    or      p1,#40h
    or      P_MODE,#PhoneNumberOK    ;Set phonenumbersOK Flg
    call    wait_key_off        ;wait for key release
    ret

LearnPhoneError:
                                ;exit point when things are bad
    ld      @DigitPointer,#0ffh        ;Indicates termination of
phone number
    RedLedOff
    or      p1,#40h

```



```

ld    MODE, #0
and   P_MODE, #~PhoneNumberOK ;reset PhoneNumberOk Flg
scf
ret

```

```

;*****
; CheckFirstDigit
;
;
;
;

```

Function:

Checks the 1st digit of an entered code. It must not be zero.
 If the first digit is one the learn nine more digits or else learn
 six more digits.

Returns:

CF = 0 - 1st digit is valid for the device being learned.
 CF = 1 - 1st digit is invalid ...

Modifies:

LoopCounter:

Subords:

None.

CheckFirstDigit:

```

ld      LoopCounter, #10      ;Default 10 digits
cp      KEY_NUMBER, #KEY_0
jr      eq, FirstWrong

```

```

cp      KEY_NUMBER, #KEY_1    ;If first # !=1 then enter only 7
digits
jr      eq, FirstOK

```

```

ld      LoopCounter, #6

```

FirstOK:

```

rcf
ret

```

FirstWrong:

```

ld      LoopCounter, #0      ;Enable Playback if Zero key

```

is pressed first

```
scf
jr    ProcessPlayBack
ret
```

```
*****
;
; ProcessRecordKey:
```

```
; Enables Recording of Out Going Message
```

```
*****
```

```
ProcessRecordKey:
```

```
call wait_key_off      ;Wait for release of key
ldrr  LOOP_COUNTER_H,LOOP_COUNTER_L,T30_SECONDS    ;20
second max recording
```

```
;but
```

```
wait for 30 seconds just in case.
```

```
ld    p1,#06h          ;Turn on recording.
call  port_delay
call  WaitForKeyPressUserDelay    ;waits 30 seconds in learn mode
jp    nc,RecordError
ld    p1,#07h          ;Turn off recording
```

```
RecordError:
```

```
ld    p1,#07h          ;Turn off recording
or    MODE,#0h         ;Recording completed.
ret
```

```
ProcessPlayBack:      ;Program + 0 will initiate Playback
```

```
call  wait_key_off
ld    p1,#03h
call  port_delay
ldrr  LOOP_COUNTER_H,LOOP_COUNTER_L,T30_SECONDS    ;20
second max recording
```

```
;but
```

```
wait for 30 seconds just in case.
```

```
call  WaitForKeyPressUserDelay    ;waits 30 seconds in learn mode
jp    nc,RecordError
```

```
ld    p1,#07h          ;Turn off recording
scf                                ;set carry flag to exit from
```

```
program mode.
```

```
jr    RecordError
```

■

```

;*****
;
; FILENAME: keynew.src

```

```

;
;
;

```

```

; DESCRIPTION:

```

```

; Parses the key pad. There are 12 keys on the key pad.
; The program key allows the user to program the phone number to dial.
; The record key allows the user to record the outgoing message.

```

REVISION HISTORY:

Version: 0.1

Date: 07/25/00, Author:

```

; *** Public Functions ***

```

```

;

```

```

;

```

```

;

```

```

; ** Internal Functions **

```

```

;

```

```

;
;*****
;

; ** include files **
    .include "fvt.inc"
    .include "data.inc"
    .include "equ.inc"
    .include "keydef.inc"
    .include "macro.inc"

; ** external functions **
    .extern set_t16_timer           ; Sets up timer for keyscan time-out.
    .extern disable_t16_timer
    .extern mul_8
    .extern FlashGreenLed
    .extern FlashRedLed
    ;.extern InterDigitDelay
; ** public functions **
    .global delay_500uS
    .global delay_100ms
    .global WaitForKeyReleaseAndStartThreeSecTimer
    .global WaitForKeyReleaseFlashRed
    .global WaitForKeyRelease
    .global WaitForKeyPress
    .global WaitForKeyPressUserDelay
    .global ScanKeyPad
    .global wait_key_off
    .global delay_10ms
    .global delay_ms
    .global check_key
    .global port_delay

;*****
;
;    Wait for key depressed or
;    timeout if no key in 15 seconds
;
;
;    check every 32 msec.
;    return with cf=1 & key_number
;*****
WaitForKeyPress:
    tbitnz MODE, #PROGRAM_MODE, SetActionTime    ;Time

```

out for Program mode

```
ldrr LOOP_COUNTER_H,LOOP_COUNTER_L,T8_SECONDS
```

```
jr NotActionTime
```

SetActionTime:

```
ldrr LOOP_COUNTER_H,LOOP_COUNTER_L,T8_SECONDS
```

NotActionTime:

```
call wait_key_off          ;if key already pressed, wait
here
```

```
tbitz MODE,#PROGRAM_MODE, NoRedLED
GreenLedOn
```

NoRedLED:

WaitForKeyPressUserDelay:

```
ldw
CURR_LOOP_COUNTER_H,CURR_LOOP_COUNTER_L,LOOP_COUNTER_H,LOOP_CO
UNTER_L
or IO_FLAGS,#TIMEOUT_FLAG      ; This enables the time-out
routine in IRIRQ.S
call set_t16_timer             ; Give them a limited time in
which to respond
```

WaitForKeyOrTimeOut:

```
call ScanKeyPad
jr nc, NoKey_CheckForTimeOut
```

```
ld tmp_key, KEY_NUMBER
ld loop_cnt,#50
```

bounce_lop:

```
call ScanKeyPad
jr nc, NoKey_CheckForTimeOut    ; no key
cp tmp_key, KEY_NUMBER
jr nz, NoKey_CheckForTimeOut    ; not matched
djnz loop_cnt,bounce_lop
```

```
call disable_t16_timer          ; Found a key, Stop the Time_out
counter.
scf
ret
```

NoKey_CheckForTimeOut:

tbitnz IO_FLAGS,#TIMEOUT_FLAG, WaitForKeyOrTimeOut

call disable_t16_timer ; Timed_out, Stop the Time_out counter.

rcf

ret

;sole control key matrix

; Scan Key Pad

; set key matrix ports for the SC500 series

; col 0 = p0.0 row 0 = p2.0

; col 1 = p0.1 row 1 = p2.1

; col 2 = p0.2 row 2 = p2.2

; row 3 = p2.3

; if key is not depressed then return with

KEY_NUMBER = 0xff;

ScanKeyPad:

and p0, #KeyPadMask ; All columns are low

ld KEY_NUMBER,#0ffh ;default key number

; Get row #, scan ports p2.0 to p2.3

clr row ;set row counter to zero

ld i,#00000001b ;start bit at pin 2.0

row_scan_loop:

cp row,#4

jr ugt,exit_key_scan

ld j,i

and j,p2 ;compare mask to port 2

jr z,row_found ;zero flag is set if row is found

inc row ;increment row counter

rl i ;try next row

jr nc,row_scan_loop ;do while c f is not set, end loop after

8

rows

jr exit_key_scan

row_found:

```

;
;*****
;   Get col #, scan ports p0.0 to p0.2
;*****
;
;   clr    col                ;set col counter to 0
;   or     p0,#11111111b      ; Start with Column0 (p0.0)
;   and    p0,#11111110b      ; clr p0.0
col_scan_loop:
;   cp     col,#4
;   jr     ugt,exit_key_scan

;   call   port_delay          ;allow port to settle
;   call   port_delay          ;allow port to settle, maybe you donot
;   need two delays but leave itfor now.

;   cp     p2,#0fh            ;check if a row pin gets pulled low
;   ld     r5,p2
;   and    r5,#0fh
;   cp     r5,#0fh
;   jr     ne, compute_key_num ;if a row pin is pulled low exit loop
;   ld     r5, p0
;   or     r5, #KeyPadMask
;   rl     r5
;   or     r5, #KeyPadMask
;   and    p0, r5
;   jr     nc,exit_key_scan    ;if pins 2 thru 7 were checked exit loop
;   inc    col                 ;else increment col counter
;   jr     col_scan_loop       ;begin loop again, check next
column
;
;   exit_key_scan:
;       and    p0,#KeyPadMask ;reset the key
;   output ports
;       rcf    ;no valid key pressed
;       ret    ;return 0xff in
KEY_NUMBER
;
;*****
;   Compute key number and return it
;   Formula: row * 3 + col = key number
;*****
;   compute_key_num:
;       ld     r11, row

```



```

ld    r13, #3
call  mul_8
add   r13, col
ld    KEY_NUMBER, r13
and   p0, #KeyPadMask      ; All columns are low
call  TranslateKeyNumber
scf
ret                                ;return valid key number in
KEY_NUMBER

```

WaitForKeyRelease:

```

wait_key_off:
    and   p0, #KeyPadMask      ; All columns are low
off_lp:
    call  check_key
    jr    c, off_lp
    ret

```

WaitForKeyReleaseFlashRed:

```

    and   p0, #KeyPadMask      ; All columns are low
off_lp0:
    call  check_key
    jr    c, off_lp0
    ret

```

; Miscellaneous Delay Routines

delay_10ms:

```

    push  i
    ld    i, #20

```

delay_10ms_loop:

```

    call  delay_500uS
    djnz  i, delay_10ms_loop
    pop   i
    ret

```

delay_100ms:

```

    push  r4
    ld    r4, #50

```

delay_100ms_loop:

```

    call  delay_10ms
    djnz  r4, delay_100ms_loop

```

```

    pop    r4
    ret

```

```

delay_500uS:

```

```

    push   i
    ld     i,#23

```

```

d148uS:

```

```

    call   port_delay
    djnz   i, d148uS
    pop    i
    ret

```

```

delay_ms:

```

```

BlinkOne:

```

```

    GreenLedOn
    call   delay_500uS

```

```

BlinkOneHereToo:

```

```

    GreenLedOff

```

```

    call   delay_500uS
    djnz   i, delay_ms
    ret

```

```

;*****
;

```

```

; Delay 108usec + 40 usec for the call
;*****
;

```

```

port_delay:

```

```

    push   j
    push   j
    pop    j
    pop    j

```

```

    ret

```

```

;*****
;

```

```

; Check key ON(true), OFF(false)
;

```

```

; return:
;

```

```

;     cf = 1 if key depressed
;

```

```

;     cf = 0 if no key
;*****
;

```

```

check_key:

```

```

    and    p0, #KeyPadMask

```

```

;    cp     p2, #0ffh

```

```

    ld     r0,p2

```

```

and    r0,#0fh    ;P00-P02 should be high.
cp     r0,#0fh
jr     eq, NoKeyIsPressed

```

```

scf
ret

```

```

NoKeyIsPressed:

```

```

rcf
ret

```

```

;*****
;

```

```

;    Wait For Key Release And Start Three Second Timer

```

```

;    Determines if key was pressed for 3 seconds.

```

```

Timer    .equ    r0

```

```

;*****
;

```

```

WaitForKeyReleaseAndStartThreeSecTimer:

```

```

    ld    Timer,#0fh

```

```

KeepTiming:

```

```

    dec    Timer

```

```

    jr     z, ThreeSecPassed

```

```

    call   delay_10ms

```

```

    call   check_key

```

```

    jr     c, KeepTiming

```

```

    ret

```

```

ThreeSecPassed:

```

```

    scf

```

```

    ret

```

```

;*****
;

```

```

;*

```

```

;* Translate key number

```

```

;*

```

```

;*****
;

```

```

TranslateKeyNumber:

```

```

    ldrr   r0, r1, Translate

```

```

    addw   r0,r1,#0,KEY_NUMBER

```

```

    ldc    r2,@rr0

```

```

    ld     KEY_NUMBER, r2

```

```

    ret

```

```

TransError:

```

```
ld  KEY_NUMBER, #0ffh
ret
```

Translate:

```
.byte KEY_1
.byte KEY_2
.byte KEY_3
.byte KEY_4
.byte KEY_5
.byte KEY_6
.byte KEY_7
.byte KEY_8
.byte KEY_9
.byte KEY_RECORD
.byte KEY_0
.byte KEY_PROGRAM
.end
```

```

;*****
;
;   file name: irutil.s
;               7/27/93
;
;   utility modules
;
;*****
;
;

```

```

.include "keydef.inc"
.include "fvt.inc"
.include "data.inc"
.include "equ.inc"
.include "macro.inc"

```

```

.global mul_8
.global mult_16
.global set_t16_timer
.global disable_t16_timer
.global FlashGreenLed
.global FlashRedLed

```

```

.extern delay_10ms

```

```

;*****
;   Init timer 16 counter
;   set clock/8(each tick - 2 usec)
;   Terminal counts = 128 msec.
;*****
;

```

```

set_t16_timer:
    push    rp

```

```

    srp 2dh ;REG_GROUP + EXTEND_GROUP_D

```

```

    ld     tc16l,#0ffh

```

```

    ld     tc16h,#0ffh

```

```

    ld     ctr2,#26h    ;T16_CLK_2MHZ+T16_RESET_TOUT+T16_ENA_INT

```

```

; enable interrupt

```

```

    ld     ctr1,#11110011b    ; Set to normal mode

```

```

    or     ctr2,#T16_ENABLE

```

```

    or     0fbh, #MSK_3

```

```

    ei

```

```

    pop    rp

```

```

    ret

```

```

;*****
;
; Disable timer 16 counter
; set clock/8(each tick - 2 usec)
; Terminal counts = 128 msec.
;*****
disable_t16_timer:
    push    rp

    srp     2dh    ;REG_GROUP + EXTEND_GROUP_D

    ld      ctr2, #T16_RESET_TOUT
    and     0fbh, #~ MSK_3

    pop     rp

    and     IO_FLAGS, #~ TIMEOUT_FLAG
    ret

;*****
;
; FlashGreenled
;
;
;
;
;*****
FlashGreenLed:
    push    r8
    ld      r8, #10
fl_10:
    GreenLedOn
    call    delay_10ms
    GreenLedOff
    call    delay_10ms
    call    delay_10ms
    djnz    r8, fl_10
    pop     r8
    ret

;*****
;
;
; FlashRedled
;
;

```

```

;
;
;
;*****
FlashRedLed:
    push r8
    ld r8,#5
frl_10:
    RedLedOn
    call delay_10ms
    call delay_10ms
    RedLedOff
    call delay_10ms
    call delay_10ms
    djnz r8,frl_10
    pop r8
    ret
;*****
; Perform a 8 bit by 8 bit unsigned binary multiplication
; input: r11 = 8 multiplier
;        r12 = 0
;        r13 = 8 multiplicand
; return:
;        rr12= product
;
;*****
mul_8:
    ld mul_LEN,#9
    clr product_HI
    rcf
lp1:
    rrc product_HI
    rrc product_LO
    jr nc,nxt1
    add product_HI,MULTIPLIER
nxt1:
    djnz mul_LEN,lp1
    ret

;*****
; Function:
; mult_16
; multiply 16 bit number n number of times
;
; r9-> # of times

```

```
; r10->h byte of the multiplicand
; r11->l byte of the multiplicand
; r12->subordinates
```

```
;
;*****
```

```
mult_16:
```

```
ld r12,r10
```

```
ld r13,r11
```

```
dec r9
```

```
jr z,m_16ret
```

```
m_16:
```

```
addw r10,r11,r12,r13
```

```
djnz r9,m_16
```

```
m_16ret:
```

```
ret
```


Dialout

```
*****
;
;
;   File Name: DIALOUT.asm
;
;   8/25/00   - SN V0.1
;
;   This function does the dialing out to the phone line and piping the audio signal
;
;   Inputs: none
;
;   Outputs: none
;
*****
;
;   must be in this order
;
;   .include      "fvt.inc"
;   .include      "keydef.inc"
;   .include      "data.inc"
;   .include      "equ.inc"
;   .include      "macro.inc"
;
;   .global       DialOut
;
;   .extern        port_delay
;   .extern        enable_t16_timer
;   .extern        disable_t16_timer
;   .extern        set_t16_timer
;   .extern        delay_100ms
;   .extern        delay_10ms
;
DigitPointer .equ 40h

DialOut:

;Port 0 inoutput mode only. We donot read the DTMF signals, in.

;To dial out
;Initialize XECOM
;pull OH High
;/WR = Low
;/RD = High
;/CS = Low
```

```

;D//V = Low
;D4-D1= Digit transmitted.
;Wait till /RI goes high, Indicates the ring is stopped.
;Pipe the audio signal
;Hang up and exit
    ld        p1,#87h        ;turn on grn light
    call      InitXecom

    ld        DigitPointer,#41h
    or        p1,#10000000b    ;P1.7 pull high,
OH, off hook
    call      delay_100ms
    call      delay_100ms
KeepDialing:
    ld        r2,@DigitPointer
    cp        r2,#0ffh
    jr        eq, DialingDone
;    and      p2,#C_BIT3
;    ld        p3,#00100000b

;    or        p1,#10000000b    ;P1.7 pull high,
OH, off hook
    call      delay_100ms

    call      GetDigit
;    and      p0,#C_BIT3
;    ld        p3,#00100000b

;    call      delay_100ms
    OutDReg    r2
;    and      p0,#C_BIT3
    ld        p3,#00100000b

;    ld        p3,#00010000b

;*    ld        p3,#01010000b
    ld        p3,#01000000b
;    call      delay_100ms
    or        p0,#BIT3
;    ld        p3,#00010000b
;    ld        p3,#01000000b

```

```

inc      DigitPointer
jr       KeepDialing

; or      p3,#BIT6      ;Chip Select in inactive
;Supposedly connected
;enable playback for 30 seconds...
DialingDone:
    ld      p3,#01100000b
    call    delay_100ms
    call    delay_100ms
; jr      HangUp      ;***
DialingDone1:
; call    port_delay
; tbitz    p2,#BIT4,DialingDone1 ; Test for Ring Indicator

    ldrr    CURR_LOOP_COUNTER_H,CURR_LOOP_COUNTER_L,T8_SECONDS ;20 second max
recording
    or      IO_FLAGS,#TIMEOUT_FLAG ; This
enables the time-out routine in IRIRQ.S
    call    set_t16_timer ; Give them a
limited time in which to respond

    call    port_delay
WaitForTimeOut1:
    tbitnz  IO_FLAGS,#TIMEOUT_FLAG, WaitForTimeOut1

LoopHere:
    call    port_delay
    ldrr    CURR_LOOP_COUNTER_H,CURR_LOOP_COUNTER_L,T30_SECONDS ;20 second max
recording
    or      IO_FLAGS,#TIMEOUT_FLAG ; This
enables the time-out routine in IRIRQ.S
    call    set_t16_timer ; Give them a
limited time in which to respond
    and     p1,#0fbh
; Turn on the Audio pipe
    call    port_delay
WaitForTimeOut:
    tbitnz  IO_FLAGS,#TIMEOUT_FLAG, WaitForTimeOut
    call    disable_t16_timer ; Timed_out, Stop the
Time_out counter.

```

```
ld      p1,#87h
; Turn off the audio pipe
```

```
call    port_delay
ldrr
CURR_LOOP_COUNTER_H,CURR_LOOP_COUNTER_L,T30_SECONDS ;20 second max
recording
```

```
or      IO_FLAGS,#TIMEOUT_FLAG ; This
enables the time-out routine in IRIRQ.S
```

```
call    set_t16_timer ; Give them a
limited time in which to respond
```

```
ld      p1,#083h
; Turn on the Audio pipe
```

```
call    port_delay
```

WaitForTimeOut0:

```
tbitnz IO_FLAGS,#TIMEOUT_FLAG, WaitForTimeOut0
```

```
call    disable_t16_timer ; Timed_out, Stop the
```

Time_out counter.

```
ld      p1,#0f7h
; Turn off the audio pipe
```

HangUp:

```
and     p1,#C_BIT7 ;Hang up and out of here
```

```
ret
```

```
ret
```

WriteDTMF:

;Sets up XECOM for writing to DTMF port

```
; ld     P01M, #00000100b ; p0 = outputs (for leds) and keyscan
columns
```

```
and     p0,#C_BIT3 ;RS0=0
```

```
call    port_delay
```

```
and     p3,#C_BIT4 ;/WR=0
```

```
or      p3,#BIT5 ;/RD=1
```

```
and     p3,#C_BIT6 ;CS=0
```

```
ret
```

ReadStatus:

```
ld      p01m,#01000100b
```

```

and p3,#C_BIT6      ;cs=0
or  p0,#BIT3
or  p3,#BIT4
and p3,#C_BIT5
call delay_10ms
nop
nop
ret

```

InitXecom:

```

; ld p0,#BIT3      ;RS0=1
;* ld p3,#00010000b

;* ld p3,#00100000b
ld p3,#01010000b
ld p0,#19h;18h      ;38h      ;RegA,NoInterrupt,DTMF
mode,Touch Tone mode
ld p3,#00100000b
; ld p3,#00100000b ;Toggle line
; ld p0,#18h;38h

; ld p3,#00100000b
ld p3,#01010000b
ld p0,#99h;98h;98h      ; Write to register B. Burst mode transmit

ld p3,#00100000b
ld p3,#01010000b
ld p0,#08h;08h

ld p3,#00100000b ;*
; ld p0,#08h      ;*

; ld p3,#00100000b

ld p3,#01010000b
; or p0,#08h
; ld p3,#00010000b
; ld p3,#01010000b
ret

ret

```

GetDigit:

```
ldrr r0, r1, TranslateDigits
addw r0, r1, #0, r2
ldc r2, @rr0
```

ret

TransError:

```
ld r2, #0ffh
ret
```

TranslateDigits:

```
.byte DIGIT0
.byte DIGIT1
.byte DIGIT2
.byte DIGIT3
.byte DIGIT4
.byte DIGIT5
.byte DIGIT6
.byte DIGIT7
.byte DIGIT8
.byte DIGIT9
```

```
DATA0 .equ 00000000b
DIGIT1 .equ 00010001b
DIGIT2 .equ 00100000b
DIGIT3 .equ 00110001b
DIGIT4 .equ 01000000b
DIGIT5 .equ 01010001b
DIGIT6 .equ 01100000b
DIGIT7 .equ 01110001b
DIGIT8 .equ 10000000b
DIGIT9 .equ 10010001b
DIGIT0 .equ 10100000b
```

```

;*****
; INTERRUPT SERVICE MODULES
;
; File Name: IRQ.asm
;*****

.include "fvt.inc"
.include "keydef.inc"
.include "data.inc"
.include "equ.inc"
.include "macro.inc"

; ** external functions **

;*****
; UNUSED Interrupts
;*****

.global irq0
.global irq1
.global irq2
.global irq3
.global irq4
.global irq5

;*****
;
; IRQ3
; if io_flags.KEY_FLAG then decr. loop_count
; if loop counts == 0 then stop count down
;*****
irq3:
    push    rp
;
    srp     OUT_GROUP+EXTEND_GROUP_D
    tm      ctr2,#T16_RESET_TOUT
    jr      z,irq3_ret
;
    or      ctr2,#T16_RESET_TOUT

```

irq

```

;
;   Decr. Loop Counter
;
tm   io_flags,#TIMEOUT_FLAG
jr   z,irq3_20   ; no flag
;
subw curr_loop_counter_h,curr_loop_counter_l,#0,#1
jr   nz,irq3_ret ;not yet time out
; check low
cp   curr_loop_counter_l,#0
jr   nz,irq3_ret ;not yet time out
; Reset
and  io_flags,#~ TIMEOUT_FLAG
jr   irq3_ret
;
;   Other functions
;
irq3_20:
;
;   return
;
irq3_ret:
pop  rp
iret

*****
;   UNUSED
*****
irq0:
irq1:
irq2:
irq4:
irq5:
iret

*****
;
.end

```



```

; .list off
; *****
;
; KEY Assignment for Battery Charger
;     keydef.h
;     8/03/00
;
; So far we have the # pad and two extra keys.
; *****
BIT_0      .equ  0
BIT_1      .equ  1
BIT_2      .equ  2
BIT_3      .equ  3
BIT_4      .equ  4
BIT_5      .equ  5
BIT_6      .equ  6
BIT_7      .equ  7

; key number
KEY_0      .equ  0
KEY_1      .equ  1
KEY_2      .equ  2
KEY_3      .equ  3
KEY_4      .equ  4
KEY_5      .equ  5
KEY_6      .equ  6
KEY_7      .equ  7
KEY_8      .equ  8
KEY_9      .equ  9
KEY_RECORD .equ 10
KEY_TEST   .equ 11
KEY_PROGRAM .equ 12
MAX_VALID_KEY .equ 12      ;last valid key

; *****
;

```

```

        .list off
;*****
;   file name: data.h
;*****

; unit = 32 mseconds

T0_SECONDS    .equ    0
T2_SECONDS    .equ    55
T4_SECONDS    .equ    122
T5_SECONDS    .equ    4500/32
T8_SECONDS    .equ    270
T15_SECONDS   .equ    15000/32
T30_SECONDS   .equ    30000/32
T60_SECONDS   .equ    60000/32

;utility flags
FLAG1         .equ    BIT0
FLAG2         .equ    BIT1
FLAG3         .equ    BIT2
FLAG4         .equ    BIT3
FLAG5         .equ    BIT4
FLAG6         .equ    BIT5
FLAG7         .equ    BIT6
FLAG8         .equ    BIT7

;*****
;   internal ram/reg allocation
;*****
;
;   Register group 0 & 1 for stack ptr
;   Start from reg4
;
;*****
stack_ptr     .equ    0efh
;*****
;   Utility Group 0 - start from 4
;   0,1,2,3 are IO port
;*****
UTL_GROUP     .equ    00h
;

```

```

;
; *****
; register group 1
; Holds a 16-bit pointer to a DAT for a given device
; (AUX) can be any device.
;
; *****
PERM_GROUP      .equ 10h

; *****
MODE            .equ 11h
PROGRAM_MODE    .equ BIT1

; *****
P_MODE          .equ 12h ;default -> repeat everything

PhoneNumberOK    .equ BIT1

; *****
; register group 2
; used general purpose register group
; *****
REG_GROUP       .equ 20h

col             .equ r0
row             .equ r1

i               .equ r3
j               .equ r4

loop_cnt        .equ r9
tmp_key         .equ r7
; *****
; Register group 3 - FOR OUTPUT MODULE
; *****
OUT_GROUP       .equ 30h

io_flags        .equ r0
IO_FLAGS        .equ 30h

```

Data

```

TIMEOUT_FLAG      .equ  BIT1

LOOP_COUNTER      .equ  31H
LOOP_COUNTER_L    .equ  31H
LOOP_COUNTER_H    .equ  32H

curr_loop_counter .equ  r3
curr_loop_counter_l .equ r3
curr_loop_counter_h .equ r4
CURR_LOOP_COUNTER .equ  33H
CURR_LOOP_COUNTER_L .equ 33H
CURR_LOOP_COUNTER_H .equ 34H

KEY_FOR_CODE_FLAG .equ  39h
TEMP_MODE         .equ  3ah

```

```

KEY_NUMBER      .equ  3ch

KEY_NUMBER_BUFFER .equ  3eh
CHECK1          .equ  3fh ;leave this here

```

```

;*****
;
;   Register Group 40h
; This register group holds the phone number, one digit per byte.
;
;*****
TEL_DAT_POINTER_GROUP .equ 40h

```

```

CHECK2          .equ  6fh ;leave this here because Vince
wants it here

```

```

;*****
;
;*****
;SPARE REG BANK      0

```

```

CHECK3          .equ  7fh
SPARE_GROUP     .equ  090h

```

Data

```
COUNTER          .equ  090h

HIGH_CODE        .equ  091h
LOW_CODE         .equ  092h

MISC_FLAGS       .equ  094h      ; MISC_FLAGS
SleepFlag        .equ  BIT2      ; MISC_FLAGS

CHECK4           .equ  98h
```

```
FIRST_DIGIT      .equ  9ah
SECOND_DIGIT     .equ  9bh
THIRD_DIGIT      .equ  9ch
```

```
timer_high       .equ  r14
timer_low        .equ  r15
```

```
TIMER_HIGH       .equ  9eh
TIMER_LOW        .equ  9fh
```

```
END_OUT_REGS     .equ  9fh
```

```
*****
;
;
; *****
;
;
; *****
```

```
TEMP_X           .equ  0d0h
TEMP_Y           .equ  0d1h
```

```
*****
;
;   Control Registers
; *****
CTRL_GROUP       .equ  0f0h
; *****
;   extend data group
; *****
EXTEND_GROUP_D   .equ  0dh
EXTEND_GROUP_F   .equ  0fh
; *****
;
; .list on
```

[illegible]

```

.list off
;*****
;   file name: fvt.h
;
;*****
;   Output & Edge detector
;
;   p31 - edge detector
;   p34 - t8_out
;   p35 - t8_out & t16_out logic
;   p36 - t16_out
;
;*****
;
;   GENERAL EQUATES
;
BIT0 .equ 01h
BIT1 .equ 02h
BIT2 .equ 04h
BIT3 .equ 08h
BIT4 .equ 10h
BIT5 .equ 20h
BIT6 .equ 40h
BIT7 .equ 80h

C_BIT0 .equ 11111110b
C_BIT1 .equ 11111101b
C_BIT2 .equ 11111011b
C_BIT3 .equ 11110111b
C_BIT4 .equ 11101111b
C_BIT5 .equ 11011111b
C_BIT6 .equ 10111111b
C_BIT7 .equ 01111111b
;
;   PORTS
;
Port0 .equ 00
Port1 .equ 01
Port2 .equ 02
Port3 .equ 03
;
;
;   register definitions

```

```

;
; 17x registers
;
; bank D
;
ctr0 .equ 00h
ctr1 .equ 01h
ctr2 .equ 02h
tc8l .equ 04h
tc8h .equ 05h
tc16l .equ 06h
tc16h .equ 07h
lo16 .equ 08h
hi16 .equ 09h
lo8 .equ 0ah
hi8 .equ 0bh

Bank F

pcon .equ 00 ;xxxx xxx0
smr .equ 0b ;0010 00x0
smr2 .equ 0d ;x0x0 00xx
wdtmr .equ 0f ;xxx0 1101

Control register 0
Counter/timer 8 control register

T8_ENABLE .equ BIT7

T8_SINGLE .equ BIT6
T8_RESET_TOUT .equ BIT5 ;reset flag to 0
T8_CLK_4MHZ .equ 00
T8_CLK_2MHZ .equ BIT3
T8_CLK_1MHZ .equ BIT4
T8_CLK_1_2MHZ .equ BIT4+BIT3

T8_ENA_INT .equ BIT1 ;enable Time-out int.(IRQ3)
P34_OUT .equ BIT0

T16_ENABLE .equ BIT7
T16_ENABLE_C .equ 07fh

T16_SINGLE .equ BIT6 ;transmit mode

```



```

T16_IGNORE_EDGE .equ  BIT6  ;t16 ignore edge
T16_RESET_TOUT  .equ  BIT5  ;reset flag to 0
T16_CLK_4MHZ    .equ  00
T16_CLK_2MHZ    .equ  BIT3
T16_CLK_1MHZ    .equ  BIT4
T16_CLK_1_2MHZ  .equ  BIT4+BIT3

T16_CAP_INT     .equ  BIT2  ;enable data capture int.

T16_ENA_INT     .equ  BIT1  ;enable Time-out int.(IRQ3)
P35_OUT         .equ  BIT0
;
;   delay unit based on t16 - use 2mhz
;   terminal counts = 32 mseconds
;
UNIT           .equ  010000h/2/1000

;
;   piem - port 1 mode selection regiser
;
piem           .equ  0ch
P1_ADDR        .equ  BIT4
P1_H_IMPEDENCE .equ  BIT4+BIT3
;
;   pcon - port configuration register
;
;
P36_P00_COMPR  .equ  BIT0
;
;   p3m - port 3 mode register
;
;
P2_PUSH_PULL   .equ  BIT0

P31_ANALOG_MODE .equ  BIT1

;
;
P33_IN_P34_OUT .equ  00
P33_IN_P34_DM  .equ  BIT3
P33_DV_P34_RDY .equ  BIT4

P31_DV_P36_RDY .equ  BIT5  ;TOUT
;
;   p01m
;   p0 & P1 - port 0 & 1 mode register

```

```

;
; p00 - p03 mode
;
P00_OUT    .equ  00
P00_IN     .equ  BIT0
P00_ADDR   .equ  BIT1

STACK_INTERNAL .equ  BIT2

P01_OUT    .equ  00
P01_IN     .equ  BIT3
P01_ADDR   .equ  BIT4
P01_HIMPE  .equ  BIT4+BIT3

EXT_MEM_EXTEND .equ  BIT5

;
; p04 - p07 mode
;
P04_OUT    .equ  00
P04_IN     .equ  BIT6
P04_ADDR   .equ  BIT7

;
; ipr - interrupt priority reg
;
; IRQ - interrupt request reg
;
IRQ_0      .equ  BIT0   ;P32 input
IRQ_1      .equ  BIT1   ;P33 input
IRQ_2      .equ  BIT2   ;P31 input
IRQ_3      .equ  BIT3   ;TC16 output/TC16 timeout
IRQ_4      .equ  BIT4   ;TC8 output/TC8 timeout
IRQ_P31L_P32L .equ  00
IRQ_P31L_P32H .equ  BIT6
IRQ_P31H_P32L .equ  BIT7
IRQ_P31H_P32H .equ  BIT7+BIT6
;
; msk - interrupt mask reg.
;
MSK_0      .equ  BIT0   ;P32 input(enable)
MSK_1      .equ  BIT1   ;P33 input
MSK_2      .equ  BIT2   ;P31 input
MSK_3      .equ  BIT3   ;TC16 output/TC16 timeout

```

```
MSK_4      .equ    BIT4    ;TC8 output/TC8 timeout
MSK_P31L_P32L .equ    00
MSK_P31L_P32H .equ    BIT6
MSK_P31H_P32L .equ    BIT7
MSK_P31H_P32H .equ    BIT7+BIT6
    .list on
```

```

.list off
;*****
;
;   file name: equ.h
;
;*****
TRUE      .equ  1
FALSE     .equ  0

ON        .equ  1
OFF       .equ  0

YES       .equ  1
NO        .equ  0

HIGH     .equ  1
LOW      .equ  0

ACTIVE_LOW      .equ  0
ACTIVE_HIGH     .equ  BIT1
BIT_COMPLEMENT .equ  BIT2

** Status LED's - p00, p01 **
GreenLedEnable .equ  C_BIT1
GreenLedDisable .equ  BIT1

RecordLedEnable .equ  C_BIT0
RecordLedDisable .equ  BIT0

KeyPadMask      .equ  0f8h

```

```

; .list off
;*****
srp .macro arg1
; .byte 31h, #(arg1)
ld rp, #arg1
.endm
;*****
; STOP macro
;*****
m_stop .macro
ei
nop
nop
stop
.endm
;*****
; HALT macro
;*****
m_halt .macro
ei
nop
nop
halt
.endm
;*****
Select_Xecom .macro
and p3, #C_BIT6
.endm
;*****
ToggleBits .macro
and p0, #0fh ;reset
ld p3, #00000000b
; and p3, #C_BIT4 ;Reset p3.4
; and p3, #C_BIT5 ;Reset p3.5
and p0, #C_BIT3 ;Reset p0.3 RS0
; or p3, #BIT6 ;CS=1

.endm
;*****
; rs0wrrd macro
;*****
rs0wrrd .macro const1, const2, const3

```

```

call port_delay
or p3,#C_BIT6 ;CS=0
or p0,#const1 ;Set p0.3 appropriately
; and p3,#const2 ;set P3.4
; or p3,#const3 ;set P3.5
ld p3,#00100000b ;rd=1, wr=0
call port_delay
.endm

; *****
; outdata macro
; *****
outdata .macro const1
; and p0,#00001111b
ld p0,#const1
.endm

; *****
OutDReg macro
Same as outdata but uses register
; *****

OutDReg .macro reg
and p0,#00001111b
ld p0,reg
.endm

; *****
turn on green led

; *****
GreenLedOn .macro
and p0, #GreenLedEnable
.endm

; *****
; turn off green led

; *****
GreenLedOff .macro
or p0, #GreenLedDisable
.endm

; *****
; turn on red led

```

```

;*****
RedLedOn    .macro
    and    p0, #00h    ;RedLedEnable
.endm
;*****
;    turn off red led
;*****
RedLedOff   .macro
    or     p0, #0ffh    ;RedLedDisable
.endm
;*****
;    load pair register
;    reg1 = high, reg2 = low
;    reg3 = high, reg4 = low
;*****
ldw    .macro reg1,reg2,reg3,reg4
    ld     reg1,reg3
    ld     reg2,reg4
.endm
;*****
;    Load pair register
;    reg1 = high reg
;    reg2 = low reg
;*****
ldrr   .macro reg1,reg2,const
    ld     reg1, #HIGH(const)
    ld     reg2, #LOW(const)
.endm
;*****
;    add a word
;    tgtlow,tgthigh = result
;    srclow,srchigh = adder
;*****
addw   .macro tgthgh,tgtlow,srchgh,srclow
    add     tgtlow,srclow
    adc     tgthgh,srchgh
.endm
;*****
;    subtract a word

```

```

;   tgtlow,tgthigh = result
;   srclow,srchigh = adder
;*****
subw   .macro tgthgh,tgtlow,srchgh,srclow
    sub   tgtlow,srclow
    sbc   tgthgh,srchgh
.endm

;*****
;   subtract a word
;   tgtlow,tgthigh = result
;   srclow,srchigh = adder
;*****
sub3byte .macro tgthgh,tgtmid, tgtlow,srchgh,srcmid,srclow
    sub   tgtlow,srclow
    sbc   tgtmid,srcmid
    sbc   tgthgh,srchgh
.endm

;*****
;   Shift to right through carry
;*****
shtr   .macro reg0
    rcf
    rrc   reg0
.endm

;*****
;   Shift to left through carry
;*****
shlt   .macro reg0
    rcf
    rlc   reg0
.endm

;*****
;   Test bit and jump if zero flag = 1
;*****
tbitz  .macro flag,bit,jmp
    tm    flag,bit
    jr    z,jmp
.endm

;*****
;   Test bit and jump if zero flag = 0
;*****
tbitnz .macro flag,bit,jmp

```



```
,
.list on
```

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LINK MAP:

Date: Wed May 16 18:15:11 2001

Processor: Z8

Files: [Command] D:\battcharger\dcbc.cmd

[Object] D:\battcharger\main.o

[Object] D:\battcharger\KEYNEW.o

[Object] D:\battcharger\SRVKEY.o

[Object] D:\battcharger\Dialout.o

[Object] D:\battcharger\UTIL.o

[Object] D:\battcharger\irq.o

COMMAND LIST:

```
=====
1: -q D:\battcharger\dcbc.cmd
2: ; ZDS Generated Linker Command File
3: -A
4: -g
5: -m "D:\battcharger\dcbc.map"
6: Range RFILE %0,%100
7: Range XDATA %4000,%C000
8: Range ROM %0,%4000
9: -o "D:\battcharger\dcbc"
10: "D:\battcharger\main.o"
11: "D:\battcharger\KEYNEW.o"
12: "D:\battcharger\SRVKEY.o"
13: "D:\battcharger\Dialout.o"
14: "D:\battcharger\UTIL.o"
15: "D:\battcharger\irq.o"
```

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SPACE ALLOCATION:

```
=====
Space          Base  Top   Span
-----
ROM            00000000 00000493 494h
```

SEGMENTS WITHIN SPACE:

```
=====
ROM          Type    Base  Top   Span
```

```
-----
code                relocatable 00000000 00000493    494h
```

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SEGMENTS WITHIN MODULES: =====

Module: main.asm (File: D:\battcharger\main.o) Wed May 16 18:15:07 2001

Name	Base	Top	Size

Segment: code	00000000	000000FE	255

Module: KEYNEW.asm (File: D:\battcharger\KEYNEW.o) Mon May 07 10:42:35 2001

Name	Base	Top	Size

Segment: code	000000FF	0000023F	321

Module: SRVKEY.asm (File: D:\battcharger\SRVKEY.o) Wed May 16 18:15:09 2001

Name	Base	Top	Size

Segment: code	00000240	000002FF	192

Module: Dialout.asm (File: D:\battcharger\Dialout.o) Wed May 16 18:05:57 2001

Name	Base	Top	Size

Segment: code	00000300	000003ED	238

Module: UTIL.asm (File: D:\battcharger\UTIL.o) Mon May 07 10:42:40 2001

Name	Base	Top	Size

Segment: code	000003EE	0000046B	126

Module: irq.asm (File: D:\battcharger\irq.o) Mon May 07 10:42:42 2001

Name	Base	Top	Size

Segment: code	0000046C	00000493	40

EXTERNAL DEFINITIONS BY ADDRESS:

Symbol	Address	Module	Segment
WaitForKeyPress	000000FF	KEYNEW.asm	code
WaitForKeyPressUserDelay	0000011D	KEYNEW.asm	code
ScanKeyPad	0000014D	KEYNEW.asm	code
wait_key_off	000001B1	KEYNEW.asm	code
WaitForKeyRelease	000001B1	KEYNEW.asm	code
WaitForKeyReleaseFlashRed	000001BA	KEYNEW.asm	code
delay_10ms	000001C3	KEYNEW.asm	code
delay_100ms	000001CF	KEYNEW.asm	code
delay_500uS	000001DB	KEYNEW.asm	code
delay_ms	000001E7	KEYNEW.asm	code
port_delay	000001F6	KEYNEW.asm	code
check_key	000001FF	KEYNEW.asm	code
WaitForKeyReleaseAndStartThreeSe	00000210	KEYNEW.asm	code
ServiceCode	00000240	SRVKEY.asm	code
DialOut	00000300	Dialout.asm	code
set_t16_timer	000003EE	UTIL.asm	code
disable_t16_timer	00000409	UTIL.asm	code
FlashGreenLed	0000041A	UTIL.asm	code
FlashRedLed	00000432	UTIL.asm	code
mul_8	0000044D	UTIL.asm	code
mult_16	0000045D	UTIL.asm	code
irq3	0000046C	irq.asm	code
irq5	00000493	irq.asm	code
irq4	00000493	irq.asm	code
irq2	00000493	irq.asm	code
irq1	00000493	irq.asm	code
irq0	00000493	irq.asm	code
KEY_NUMBER	0000003C	main.asm	(unknown)
KEY_NUMBER_BUFFER	0000003E	main.asm	(unknown)

29 External symbols.

EXTERNAL DEFINITIONS BY NAME:

Symbol	Address	Module	Segment
--------	---------	--------	---------

```

-----
check_key          000001FF KEYNEW.asm  code
delay_100ms        000001CF KEYNEW.asm  code
delay_10ms         000001C3 KEYNEW.asm  code
delay_500uS        000001DB KEYNEW.asm  code
delay_ms           000001E7 KEYNEW.asm  code
DialOut            00000300 Dialout.asm  code
disable_t16_timer  00000409 UTIL.asm   code
FlashGreenLed      0000041A UTIL.asm   code
FlashRedLed        00000432 UTIL.asm   code
irq0               00000493 irq.asm    code
irq1               00000493 irq.asm    code
irq2               00000493 irq.asm    code
irq3               0000046C irq.asm    code
irq4               00000493 irq.asm    code
irq5               00000493 irq.asm    code
KEY_NUMBER         0000003C main.asm   (unknown)
KEY_NUMBER_BUFFER  0000003E main.asm   (unknown)
mul_8              0000044D UTIL.asm   code
mult_16            0000045D UTIL.asm   code
port_delay         000001F6 KEYNEW.asm  code
ScanKeyPad         0000014D KEYNEW.asm  code
ServiceCode        00000240 SRVKEY.asm  code
set_t16_timer      000003EE UTIL.asm   code
wait_key_off       000001B1 KEYNEW.asm  code
WaitForKeyPress    000000FF KEYNEW.asm  code
WaitForKeyPressUserDelay 0000011D KEYNEW.asm  code
WaitForKeyRelease  000001B1 KEYNEW.asm  code
WaitForKeyReleaseAndStartThreeSe 00000210 KEYNEW.asm  code
WaitForKeyReleaseFlashRed 000001BA KEYNEW.asm  code

```

29 External symbols.

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SYMBOL CROSS REFERENCE:

```

=====
Symbol          Module  Use
-----
check_key       KEYNEW.asm  Definition
delay_100ms     KEYNEW.asm  Definition
                main.asm   Reference
                Dialout.asm Reference
delay_10ms      KEYNEW.asm  Definition

```

	Dialout.asm	Reference
	UTIL.asm	Reference
delay_500uS	KEYNEW.asm	Definition
delay_ms	KEYNEW.asm	Definition
DialOut	Dialout.asm	Definition
	main.asm	Reference
disable_t16_timer	UTIL.asm	Definition
	main.asm	Reference
	KEYNEW.asm	Reference
	Dialout.asm	Reference
FlashGreenLed	UTIL.asm	Definition
FlashRedLed	UTIL.asm	Definition
irq0	irq.asm	Definition
	main.asm	Reference
irq1	irq.asm	Definition
	main.asm	Reference
irq2	irq.asm	Definition
	main.asm	Reference
irq3	irq.asm	Definition
	main.asm	Reference
irq4	irq.asm	Definition
	main.asm	Reference
irq5	irq.asm	Definition
	main.asm	Reference
KEY_NUMBER	main.asm	Definition
KEY_NUMBER_BUFFER	main.asm	Definition
mul_8	UTIL.asm	Definition
	KEYNEW.asm	Reference
mult_16	UTIL.asm	Definition
port_delay	KEYNEW.asm	Definition
	SRVKEY.asm	Reference
	Dialout.asm	Reference
ScanKeyPad	KEYNEW.asm	Definition
ServiceCode	SRVKEY.asm	Definition
	main.asm	Reference
set_t16_timer	UTIL.asm	Definition
	KEYNEW.asm	Reference
	Dialout.asm	Reference
wait_key_off	KEYNEW.asm	Definition
	SRVKEY.asm	Reference
WaitForKeyPress	KEYNEW.asm	Definition
	main.asm	Reference
	SRVKEY.asm	Reference
WaitForKeyPressUserDelay	KEYNEW.asm	Definition

WaitForKeyRelease	KEYNEW.asm	Definition
WaitForKeyReleaseAndStartThreeSe	KEYNEW.asm	Definition
WaitForKeyReleaseFlashRed	KEYNEW.asm	Definition

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100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 2500 2600 2700 2800 2900 3000 3100 3200 3300 3400 3500 3600 3700 3800 3900 4000 4100 4200 4300 4400 4500 4600 4700 4800 4900 5000 5100 5200 5300 5400 5500 5600 5700 5800 5900 6000 6100 6200 6300 6400 6500 6600 6700 6800 6900 7000 7100 7200 7300 7400 7500 7600 7700 7800 7900 8000 8100 8200 8300 8400 8500 8600 8700 8800 8900 9000 9100 9200 9300 9400 9500 9600 9700 9800 9900 10000

0 Warnings
0 Errors

```

irq5    X 00000493
irq4    X 00000493
irq2    X 00000493
irq1    X 00000493
irq0    X 00000493
irq3    X 0000046C
mult_16 X 0000045D
mul_8   X 0000044D
FlashRedLed X 00000432
FlashGreenLed X 0000041A
disable_t16_timer X 00000409
set_t16_timer X 000003EE
DialOut X 00000300
ServiceCode X 00000240
WaitForKeyReleaseAndStartThree X 00000210
check_key X 000001FF
port_delay X 000001F6
delay_ms X 000001E7
delay_500uS X 000001DB
delay_100ms X 000001CF
delay_10ms X 000001C3
WaitForKeyReleaseFlashRed X 000001BA
wait_key_off X 000001B1
WaitForKeyRelease X 000001B1
ScanKeyPad X 0000014D
WaitForKeyPressUserDelay X 0000011D
WaitForKeyPress X 000000FF
KEY_NUMBER X 0000003C
KEY_NUMBER_BUFFER X 0000003E

```


ZiLOG Developer Studio Workspace File

WARNING: DO NOT EDIT OR DELETE THIS WORKSPACE FILE!

[PRJ VERSION]

#begin

VERSION = 300

#end

[MCU TARGET]

#begin

NAME = Z86L72

#end

[EMULATOR]

#begin

NAME = Z86L7100ZEM

#end

[PRJ NAME]

#begin

NAME = dcbc.zws

TYPE = APP

#end

[PRJ PATH]

#begin

PATH = D:\battcharger\

#end

[FILES]

#begin

SOURCE = main.asm

SOURCE = KEYNEW.asm

SOURCE = SRVKEY.asm

SOURCE = Dialout.asm

SOURCE = UTIL.asm

SOURCE = irq.asm

#end

[DEPENDENCIES]

#begin

DEP = fvt.inc

DEP = keydef.inc

DEP = data.inc

```
DEP = equ.inc  
DEP = macro.inc  
#end
```

```
[C SETTINGS]  
#begin  
C = -g  
C = -Ms  
C = -W  
C = -ZiLOG  
#end
```

```
[ASM SETTINGS]  
#begin  
ASM = -l -g -q  
#end
```

```
[LNK SETTINGS]  
#begin  
LNK = -Z -g -m -q  
LNK = -r RFILE %0 : %FF  
LNK = -r XDATA %4000 : %FFFF  
LNK = -r ROM %0 : %3FFF  
#end
```

```
[LIB SETTINGS]  
#begin  
LIB = -q  
#end
```

```
[DEBUG SETTINGS]  
#begin  
VALUE = 0  
PAD = 0  
#end
```

```
[COM SETTINGS]  
#begin  
PORT = COM2  
BR = 57600  
#end
```

```
[WND STATUS]  
#begin
```

ID = 0
OPEN = 0
ID = 1
OPEN = 0
ID = 2
OPEN = 0
ID = 3
OPEN = 0
ID = 4
OPEN = 0
ID = 5
OPEN = 0
ID = 6
OPEN = 0
ID = 7
OPEN = 0
ID = 8
OPEN = 0
ID = 9
OPEN = 0
ID = 10
OPEN = 0
ID = 11
OPEN = 0
ID = 12
OPEN = 0
ID = 13
OPEN = 0
ID = 14
OPEN = 0
ID = 15
OPEN = 0
ID = 16
OPEN = 0
ID = 17
OPEN = 0
ID = 18
OPEN = 0
ID = 19
OPEN = 0
ID = 20
OPEN = 0
ID = 21
OPEN = 0

```
ID = 22  
OPEN = 0  
ID = 23  
OPEN = 0  
ID = 24  
OPEN = 0  
ID = 25  
OPEN = 0  
ID = 26  
OPEN = 0  
ID = 27  
OPEN = 0  
#end
```

```
[OTP SETTINGS]  
#begin  
DEVICE = Z86E72  
TOPMARK = Standard  
TYPE = -2124744304  
OPTIONS = 0  
METHOD = 0  
SIZE = 1  
ADDRESS = 4294967295  
SERIALNUMBER = 4294967295  
REP = 0  
#end
```

```
[WATCH SETTINGS]  
#begin
```

```
#end
```

```
[C WATCH SETTINGS]  
#begin
```

```
TabId = 0  
TabId = 1  
TabId = 2  
TabId = 3  
#end
```

```
[OVERRIDE SETTINGS]  
#begin  
STATUS = 0  
SIZE = 16384
```

#end

[BREAKPOINT SETTINGS]

#begin

FILENAME = D:\battcharger\SRVKEY.asm

LINE = 201

ADDRESS = 0x000002fa

FILENAME = D:\battcharger\SRVKEY.asm

LINE = 198

ADDRESS = 0x000002f4

FILENAME = D:\battcharger\SRVKEY.asm

LINE = 112

ADDRESS = 0x0000028b

FILENAME = D:\battcharger\Dialog.asm

LINE = 146

ADDRESS = 0x00000390

FILENAME = D:\battcharger\Dialog.asm

LINE = 138

ADDRESS = 0x0000038c

FILENAME = D:\battcharger\main.asm

LINE = 184

ADDRESS = 0x000000a4

FILENAME = D:\battcharger\main.asm

LINE = 165

ADDRESS = 0x00000098

#end

:10000000049304930493046C04930493E6FE00E6C3
 :10001000FFEFE6F700E6F6FFE6F804E6FD0DE60082
 :1000200020E60103E60220E6FD0FE60F00E600FEF3
 :10003000E60E04760080EB2CE60020E6FD20A63FCD
 :10004000AAEB0AA66FAAEB05A67FAA6B17E6FD002E
 :1000500058FFB1E500E5A6E505EBF7E63FAAE66F38
 :10006000AAE67FAAE6FD20E61100E61200E6020FEE
 :10007000E60147460340E600084600FF1803760302
 :10008000026B217603046B1CD600FFFB7D7D602401F
 :10009000D600FF7BF8D604097603026B07760304CB
 :1000A0006B028BC0E64CFFD601CFD603008BB54365
 :1000B0006F70797269676874202863293230303034
 :1000C0002D32303031204368616D6265726C616938
 :1000D0006E2047726F75702E20446576656C6F7068
 :1000E00065642062792059616D7465636820496E8A
 :0F00F000632C20383437203936332032383239F8
 :1000FF00761102EB08E63201E6310E8B06E632018D
 :10010F00E6310ED601B17611026B035600FDE432D3
 :10011F0034E43133463002D603EED6014DFB157869
 :10012F003C9C32D6014DFB0CA43CE7EB079AF4D66E
 :10013F000409DFAF763002EBE1D60409CFAF5600EA
 :10014F00F8E63CFFB0E13C01A6E104BB3D48E354B7
 :10015F0002E46B071E90E3FBEF8B2FB0E04600FF2E
 :10016F005600FEA6E004BB22D601F6D601F65802D1
 :10017F0056E50FA6E50FEB17580046E5F890E54654
 :10018F00E5F854E500FB030E8BD95600F8CFAFB856
 :10019F00E1DC03D6044D02D0D93C5600F8D602213B
 :1001AF00DFAF5600F8D601FF7BFBAF5600F8D60144
 :1001BF00FF7BFBAF70E33C14D601DB3AFB50E3AFA0
 :1001CF0070E44C32D601C34AFB50E4AF70E33C17E6
 :1001DF00D601F63AFB50E3AF5600FDD601DB4600E1
 :1001EF0002D601DB3AF2AF70E470E450E450E4AFB2
 :1001FF005600F8080256E00FA6E00F6B02DFAFCFF4
 :10020F00AF0CFF00E06B09D601C3D601FF7BF4AF43
 :10021F00DFAF0C021C34043CE116E000C220293C85
 :10022F00AFE63CFFAF0102030405060708090A0009
 :01023F000CB2
 :10024000A63C0CBB0CA63C0A6D02C6A63C0C6D027B
 :1002500052AF4611025601BFE64041D601B1E63227
 :1002600003E631A9D6011DFD029FD602B07D029F93
 :10027000F53C402040D600FFFD029F5600FDA63C05
 :1002800009BD029FF53C4020408AEAE740FF460056
 :10029000FFE61100CF460140461202D601B1AFE79A
 :1002A00040FF4600FF460140E611005612FDDFAF59

:1002B0008C0AA63C006B09A63C016B028C06CFAFF2
 :1002C0008C00DF8B20AFD601B1E63203E631A9E620
 :1002D0000106D601F6D6011DFD02DEE60107E601A4
 :1002E00007461100AFD601B1E60103D601F6E632AA
 :1002F00003E631A9D6011DFD02DEE60107DF8BDE34
 :10030000E60187D603B5E64041460180D601CFD647
 :1003100001CFE540E2A6E2FF6B15D601CFD603D5AB
 :100320002900E60320E6034046000820408BE3E670
 :100330000360D601CFD601CFE63401E6330E463056
 :1003400002D603EED601F6763002EBFBD601F6E6D6
 :100350003403E633A9463002D603EE5601FBD6013C
 :10036000F6763002EBFBD60409E60187D601F6E605
 :100370003403E633A9463002D603EEE60183D60104
 :10038000F6763002EBFBD60409E601F756017FAFA3
 :100390005600F7D601F65603EF4603205603BFAFCB
 :1003A000E6F8445603BF4600084603105603DFD65E
 1003B00001C3FFFFAFE60350E60019E60320E603A2
 1003C00050E60099E60320E60350E60008E6032025
 1003D000E60350AFAF0C031CE4021216E000C2208B
 0E03E000AF2CFFAFA011203140516071809111
 1003EE0070FDE6FD2DE606FFE607FFE60226E601B6
 1003FE00F346028046FB089F50FDAF70FDE6FD2DD3
 10040E00E6022056FBF750FD5630FDAF70E88C0A21
 :10041E005600FDD601C3460002D601C3D601C38ADB
 10042E00EF50E8AF70E88C05560000D601C3D60138
 10043E00C34600FFD601C3D601C38AEC50E8AFEC29
 10044E0009B0ECCFC0ECC0EDFB0202CBEAF6AFC8B0
 0E045E00EAD8EB00E96B0602BD12AC9AFAAFC9
 10046C0070FDE6FD3D7602206B1A46022076E00216
 :10047C006B1226E30136E400EB0AA6E300EB05560B
 :08048C00E0FD8B0050FDBFBF35
 :00000003FD
 :00000001FF


```

*****
;
; FILENAME: findkey.s

```

```

;

```

```

;

```

```

; DESCRIPTION:

```

```

;

```

REVISION HISTORY:

```

V1.0 Date: 6/7/94
V2.0 Date: 8/14/96
V3.0 Date: 10/96 Author:

```

```

*****

```

```

; ** include files **

```

```

#include fvt.h
#include data.h
#include equ.h
#include keydef.h
#include macro.h

```

```

; ** external functions **

```

```

.extern ParseDAT
.extern CheckPunchThru

```

```

.extern WaitForKeyReleaseFlashRed
.extern SendIR
.extern SetDriver
.extern ScanKeyMap

.extern mul_8
.extern check_key
.extern blink_green

.extern GetSleepTime
.extern ConfigForSleep
.extern DeviceLightsOff

.extern CheckVolPriority

; ** public functions **

.global SendCode

*****
FILENAME: findkey.s

; SendCode
;
; Version:
; Date: 09/30/96, 11:42:30
; Author:
;
; Function: Sends Key Data for all send modes, ie Normal, Action, and Double Actio
n
;
; Inputs:
;   KEY_NUMBER = (range of 0 to 36), only sending keys if it got here
;   IR_MODE = signifies if in action/double action/punchthru/ ....
;
;   SELECTED_DEVICE = last device key hit /// ACTIVE_DEVICE = current
device to send
;   DEVICE_FLAG = last device key hit to restore last code after punchthru
;   SendCounter = number of times to send 1 = send once (if 0 then send once
only)
;   OVERLAY_ADDR, OVERLAY_ADDR+1: address to overlayed dat file
;
MapSize .equ #40

```

```

;
; Returns:
;   CF = 0 - OK
;   CF = 1 - Error
;
; Modifies:
;
; Subords:
;
;*****
SendCode:
    ;** punch thru overhead **

    push    DEVICE_FLAG                ; in case we do
    punch thru we can get back to original mode

    ld      ACTIVE_DEVICE, SELECTED_DEVICE
    ld      ACTIVE_DEVICE+1, SELECTED_DEVICE+1

    ;** volume priority **
    call    CheckVolPriority            ; reconfigs for device with
    volume priority

PunchThruStart:
    and     %fc, #11111100b            ; clear user flags

    ld      r0, ACTIVE_DEVICE
    or      r0, ACTIVE_DEVICE+1
    jp      z, ExitError                ; code isn't programmed,
ExitError

    ld      r0, ACTIVE_DEVICE
    ld      r1, ACTIVE_DEVICE+1        ; rr0 = pointer to
dat file

    ;** rr0 ptr to dat file, parse the 1st and 2nd byte of the dat file **
    ldc     r3, @rr0
    ld      MOD_TYPE, r3
    incw    rr0
    ldc     r3, @rr0
    ld      CODE_LEN_BITS, r3          ; CODE_LEN_BITS defined

    and     r3, #3fh
    ld      r4, r3

```

```

    sra    r3
    sra    r3                ; divide
CODE_LEN_BITS by 8
    sra    r3
    and    r4, #07h
    jr     z, NoRemainder    ; if the lower 3
bits are 0, there will be no remainder.
    inc    r3
NoRemainder:
    ld     CODE_LEN_BYTES, r3    ;
CODE_LEN_BYTES defined

    ;** parse the 1st and 2nd byte of the dat file **
    incw   rr0                ; point to
CARRIER (3rd byte of dat file)
    call   ParseDAT            ; inputs: rr0=ptr to dat+2
(CARRIER), MOD_TYPE; output:rr0 points to keymap[0]

    ;** adjust KEY_NUMBER to action/double_action range **
    tbitnz IR_MODE, #DOUBLE_ACTION_MODE, InDoubleActionMode
    tbitnz IR_MODE, #ACTION_MODE, InActionMode
    jr     OverHeadDone

InDoubleActionMode:
    add    KEY_NUMBER, #MapSize    ; adjust to
ActionMode
InActionMode:
    add    KEY_NUMBER, #MapSize    ; adjust to
ActionMode

OverHeadDone:
    ld     KEY_NUMBER_BUFFER, KEY_NUMBER    ; make a copy for
checkpowerflag
    ;** KEY_NUMBER defined, check if pip special feature **
    ; call CheckPipFlag            ; add 40 to
KEY_NUMBER if needed

    ;** rr0 points byte after FLAG byte! Either keymap[0] or standardkeygroup **
    call   CheckStandardKeys        ; adjust rr0 to
STANDARD_NUMBER_GROUP if FLAG set
    jr     nc, OffsetConfigured    ; c=0 if standard key

    ;** rr0 points to keymap [0] **
    call   ScanKeyMap                ; input:

```

KEY_NUBMER and rr0 = pointer to keymap[0]; output: KEY_NUMBER = offset into dat
 jr nc, KeyInMap

;** not in keymap, check if it's overlayed **

call CheckOverlay ; returns: rr0

points to flag byte

jr c, NoOverlay

call ReconfigFlagByte ; inputs: rr0 points to flag byt

e

incw rr0 ; point to byte

after flag byte

jr OverHeadDone

NoOverlay:

call CheckPunchThru ; returns: c=0 if

punchthru

jp nc, PunchThruStart

jr ExitError

;rr0 points to rawkeydata[0]

KEY_NUMBER is to offset into rawkeydata[table]

KeyInMap:

call CheckPowerFlag ; adjust

KEY_NUMBER if [POWER] key hit

OffsetConfigured:

;** rr0 and KEY_NUMBER configured - move rr0 to rawkeydata **

ld r13, CODE_LEN_BYTES

ld r11, KEY_NUMBER ;holds the actual

key number

call mul_8

addw r0,r1,#0,r13

cp RF_TOGGLE, #0ffh

jr ne, NoRF

;RFOn

NoRF:

; tbitnz IR_MODE, #SCAN_MODE, NoDevLights ;in scan mode don't mess with
 the dev lights

call DeviceLightsOn ;this line must

precede the call to set driver

```
;NoDevLights:
```

```
;driver to reconstruct the code in Ram
```

```
and CODE_LEN_BITS,#3fh
```

```
call SetDriver
```

```
jr c, DriverIsSelfContained
```

```
call SendIR
```

```
DriverIsSelfContained:
```

```
;RFOff
```

```
pop DEVICE_FLAG
```

```
rcf
```

```
ret ; Exit point for IR
```

```
transmission
```

```
ExitError:
```

```
; tbitnz IR_MODE, #SCAN_MODE, NoLightsScan ;in scan mode don't mess with  
the dev lights
```

```
call DeviceLightsOn
```

```
NoLightsScan:
```

```
pop DEVICE_FLAG ; in case we do  
punch thru we can get back to orignal mode
```

```
call WaitForKeyReleaseFlashRed
```

```
scf
```

```
ret
```

```
*****
```

```
; FILENAME: findkey.s
```

```
; CheckPipFlag
```

```
; Version:
```

```
; Date: 11/01/96, 13:59:26
```

```
; Author:
```

```
; Function: For picture in picture devices
```

```
; If pip key hit then menu cluster goes into pip mode.
```

```
; If menu key hit then menu cluster goes into menu mode.
```

```
; If in double action then xx_pip == pip
```

Findkey

```
; Inputs: KEY_NUMBER
;         IR_MODE (pip flag)
;
; Returns:KEY_NUMBER = KEY_NUMBER+40 if flag and mode and key hit
;         IR_MODE (pip flag - set or clears)
;
;*****
CheckPipFlag:
PipExit:ret
```

```
;*****
; FILENAME: findkey.s
```

ReconfigFlagByte

Version:

Date: 10/31/96, 10:16:49

Author:

Function: For overlay codes when re-reading the master dat file reconfig the FLG
S byte
to correctly grap the correct key data.

Inputs: rr0 points to flag byte in dat file

FLGS = FLGS for the overlayed code

Returns:

Modifies:

Subords:

ReconfigFlagByte:

```
;** rr0 points to flag byte **
```

```
ldc  r2, @rr0          ; FlagByte
```

```
;** reconfig std flag **
```

```
tbitz r2,#STANDARD_KEY_FLAG, FlagNotSet0
```

```
or   FLGS, #STANDARD_KEY_FLAG      ; set flag
```

Findkey

```

    jr    DoAction
FlagNotSet0:
    and    FLGS, #^c STANDARD_KEY_FLAG        ; clear flag

```

```

DoAction:
    ;** reconfig action flag **
    tbitz  r2,#ACTION_FLAG, FlagNotSet1
    or     FLGS, #ACTION_FLAG                ; set flag
    jr     DoDoubleAction

```

```

FlagNotSet1:
    and    FLGS, #^c ACTION_FLAG              ; clear flag

```

```

DoDoubleAction:
    ;** reconfig double action flag **
    tbitz  r2,#DOUBLE_ACTION_FLAG, FlagNotSet2
    or     FLGS, #DOUBLE_ACTION_FLAG          ; set flag
    jr     Exit2

```

```

FlagNotSet2:
    and    FLGS, #^c DOUBLE_ACTION_FLAG       ; clear flag

```

```

Exit2: ret

```

```

;*****

```

```

    FILENAME: findkey.s

```

```

CheckOverlay

```

```

    Version:

```

```

    Date: 10/02/96, 13:41:43

```

```

    Author:

```

```

    Function:

```

```

    Inputs: CODE_LEN_BITS, BIT #40h if set then overlayed code

```

```

    OVERLAY_ADDR, OVERLAY_ADDR+1: address to overlayed dat file

```

```

    Returns:

```

```

    CF = 0 - Overlayed (also clears overlay flag)

```

```

    CF = 1 - NotOverlayed or Overlayed Checked Once already or in

```

```

Action_Mode

```

```

;*****

```

```

CheckOverlay:

```



```
tbitz CODE_LEN_BITS, #OVERLAY_FLG, NotOverlaid
```

```
and CODE_LEN_BITS, #^c OVERLAY_FLG ; clear overlay flg.
```

```
ld r0, OVERLAY_ADDR
```

```
ld r1, OVERLAY_ADDR+1
```

```
rcf
```

```
ret
```

```
NotOverlaid:
```

```
scf
```

```
ret
```

```
*****
```

```
; FILENAME: findkey.s
```

```
; CheckPowerFlag
```

```
; Version:
```

```
; Date: 10/01/96, 14:36:39
```

```
; Author:
```

```
; Function: Determines if 1 is added to KEY_NUMBER.
```

```
Will add 1 if POWER_FLG set and:
```

```
if toggle=power off
```

```
or if in Action modes
```

```
(key_number > action_0)
```

```
; Inputs: KEY_NUMBER
```

```
; rr0 = POWER key data
```

```
; KEY_NUMBER = offset into dat file (1byte/key)
```

```
; KEY_NUMBER_BUFFER = key hit
```

```
; Returns:
```

```
; rr0 = points to POWER_ON or POWER_OFF key data (depending on  
toggle)
```

```
; KEY_NUMBER = offset into dat file raw data
```

```
*****
```

```
CheckPowerFlag:
```

```
tbitz CODE_LEN_BITS, #POWER_FLG, cpf_exit
```

```
cp KEY_NUMBER_BUFFER, #X_KEY_0
```

```
jr uge, AddOne
```

```

cp    KEY_NUMBER_BUFFER, #KEY_POWER
jr    nz, cpf_exit

```

```

inc    POWER_SEND_FLG
tbitnz POWER_SEND_FLG, #BIT0, cpf_exit

```

AddOne:

```

    add    KEY_NUMBER, #1                ; send power_off
if POWER_SEND_FLG = odd
cpf_exit:
    ret

```

```

;*****
;

```

```

;    FILENAME: findkey.s
;

```

```

; CheckStandardKeys
;

```

```

; Version:

```

```

; Date: 10/01/96, 16:13:33

```

```

; Author:

```

```

; Function:

```

```

; Inputs: rr0 = byte after the flag byte: maybe keymap[0] or stand_num_group
;         KEY_NUMBER = offset to raw key in dat file

```

```

; Returns:

```

```

;     if standard group:

```

```

;         rr0 = pointer to Standard_Number_Group if digit hit

```

```

;         CF = 0 - number key hit and STANDARD_KEY_FLAG set

```

```

;     else

```

```

;         rr0 = pointer to keymap[0]

```

```

;         CF = 1 - not a number key

```

```

;*****

```

```

CheckStandardKeys:

```

```

    tbitz    FLGS, #STANDARD_KEY_FLAG, FlagNotSet

```

```

    cp    KEY_NUMBER, #9

```

```

    jr    ugt, NotANumberKey

```

```

; number key hit and STANDARD_KEY_FLAG set

```

Findkey

```
ldc r2,@rr0 ; standard key
set# defined
```

```
rcf
rlc r2
ldrr r8,r9,STANDARD_KEY_TABLE
addw r8,r9,#0,r2
ldc r0,@rr8
incw rr8
ldc r1,@rr8
```

```
rcf
ret
```

NotANumberKey:

```
incw rr0 ; point to
KeyMap[0]
```

FlagNotSet:

```
scf
ret
```

```
*****
```

```
; FILENAME: g:\500\540\findkey.s
```

```
; DeviceLightsOn
```

```
; Version:
```

```
; Date: 12/09/96, 11:22:03
```

```
; Author:
```

```
; Function:
```

```
; Inputs:
```

```
; Returns:
```

```
; CF = 0 - OK
```

```
; CF = 1 - Error
```

```
; Modifies:
```

```

; Subords:
;
;*****
DeviceLightsOn:      ;lights up the Active Device key
    call DeviceLightsOff

    push    DEVICE_FLAG      ;Save it

    cp     DEVICE_FLAG,#0b0h
    jr     ult,Sat

    sub    DEVICE_FLAG,#70h
    RedLedOn

Sat:
    cp     DEVICE_FLAG, #DEV_SAT
    jr     ne, NotSat

    SatLedOn
    ;ret

NotSat:
    cp     DEVICE_FLAG, #DEV_VCR
    jr     ne, NotVcr

    VcrLedOn
    ;ret

NotVcr:
    cp     DEVICE_FLAG, #DEV_TV
    jr     ne, NotTV

    TvLedOn
    ;ret

NotTV:
    cp     DEVICE_FLAG, #DEV_RCVR
    jr     ne, NotCbl

    CblAmpLedOn
    ;ret

NotCbl:
    cp     DEVICE_FLAG,#DEV_CABLE
    jr     ne,Ledret
    AuxLedOn

```

Ledret:

```
pop    DEVICE_FLAG
ret
```

STANDARD_KEY_TABLE:

```
.extern SET_0,SET_1,SET_2,SET_3,SET_4,SET_5,SET_6,SET_7
.extern SET_8,SET_9,SET_10,SET_11,SET_12,SET_13,SET_14
.extern SET_15,SET_16,SET_17,SET_18,SET_19,SET_20,SET_21,SET_22
.extern SET_23,SET_24,SET_25,SET_26,SET_27,SET_28,SET_29
.extern SET_30,SET_31,SET_32,SET_33,SET_34,SET_35,SET_36,SET_37
.extern SET_38,SET_39,SET_40,SET_41,SET_42,SET_43,SET_44
.extern SET_45,SET_46,SET_47,SET_48,SET_49,SET_50,SET_51
.extern SET_52,SET_53,SET_54,SET_55,SET_56,SET_57,SET_58,SET_59
```

```
.word SET_0
.word SET_1
.word SET_2
.word SET_3
.word SET_4
.word SET_5
.word SET_6
.word SET_7
.word SET_8
.word SET_9
.word SET_10
.word SET_11
.word SET_12
.word SET_13
.word SET_14
.word SET_15
.word SET_16
.word SET_17
.word SET_18
.word SET_19
.word SET_20
.word SET_21
.word SET_22
.word SET_23
.word SET_24
.word SET_25
.word SET_26
.word SET_27
```

.word SET_28
.word SET_29
.word SET_30
.word SET_31
.word SET_32
.word SET_33
.word SET_34
.word SET_35
.word SET_36
.word SET_37
.word SET_38
.word SET_39
.word SET_40
.word SET_41
.word SET_42
.word SET_43
.word SET_44
.word SET_45
.word SET_46
.word SET_47
.word SET_48
.word SET_49
.word SET_40
.word SET_51
.word SET_52
.word SET_53
.word SET_54
.word SET_55
.word SET_56
.word SET_57
.word SET_58
.word SET_59
.end